



PROTECTING EMPLOYEES IN HOT ENVIRONMENTS

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Many employees spend some part of their working day in a hot environment. Employees involved in construction projects, landscaping, etc. often face hot conditions which pose special hazards to their safety and health. Title 8, California Code of Regulations, Section 3395, Heat Illness Prevention, applies to all outdoor places of employment when environmental risk factors for heat illness are present.

HEAT STRESS CAUSES BODY REACTIONS

Four environmental factors affect the amount of stress an employee faces in a hot work area: temperature, humidity, radiant heat (such as from the sun or a furnace) and air velocity. Perhaps most important to the level of stress an individual faces are personal characteristics such as age, weight, fitness, medical condition, and acclimatization to the heat.

The body reacts to high external temperature by circulating blood to the skin which increases skin temperature and allows the body to give off its excess heat through the skin. However, if the muscles are being used for physical labor, less blood are available to flow to the skin and release the heat.

Sweating is another means the body uses to maintain a stable internal body temperature when working in a hot environment. However, sweating is effective only if the humidity level is low enough to permit evaporation and if the fluids and salts lost is adequately replaced.

There are many steps a person might choose to take to reduce the risk of heat stress, such as moving to a cooler place, reducing the work pace or load, or removing or loosening some clothing.

When the body cannot dispose of excess heat, it will retain it, resulting in the increase of the body's core temperature and heart rate. As the body continues to retain heat, the individual begins to lose concentration and has difficulty focusing on a task, may become irritable or sick, and often loses the desire to drink. The next stage is most often fainting. Death is possible if the person is not immediately removed from the hot environment.

HEAT DISORDERS

Heat stroke, the most serious health problem for employees in hot environments, is caused by the failure of the body's internal mechanism to regulate its core temperature. Sweating stops and the body can no longer rid itself of excess heat. Signs include: (1) mental confusion, delirium, loss of consciousness, convulsions or coma; (2) a body temperature of 106 degrees F or higher; and (3) hot dry skin which may be red, mottled, or bluish. Victims of heat stroke will die unless treated promptly. While awaiting medical help, the victim must be removed to a cool area and his or her clothing soaked with cool water. He or she should be fanned vigorously to increase cooling. Prompt first aid can prevent permanent injury to the brain and other vital organs.

Heat exhaustion results from loss of fluid through sweating when an employee has failed to drink enough fluids or take in enough salt or both. The employee with heat exhaustion still sweats but experiences extreme weakness or fatigue, giddiness, nausea, or headache. The skin is clammy and moist, the complexion pale or flushed, and the body temperature normal or slightly elevated. Treatment is usually simple: the victim should rest in a cool place and drink water or an electrolyte solution (a beverage used by athletes to quickly restore potassium, calcium, and magnesium salts). Severe cases involving victims who vomit or lose consciousness may require longer treatment under medical supervision.

Heat cramps, painful spasms of the muscles, are caused when employees drink large quantities of water but fail to replace their bodies' salt loss. Tired muscles (those used for performing the work) are usually the ones most susceptible to cramps. Cramps may occur during or after working hours and may be relieved by taking liquids by mouth or saline solutions intravenously for quicker relief, if medically determined to be required.

Fainting (heat syncope) may be a problem for the employee unacclimatized to a hot environment and who simply stands still in the heat. Individuals usually recover quickly after a brief period of lying down. Moving around, rather than standing still, will usually reduce the possibility of fainting.

Heat rash, also known as prickly heat, may occur in hot and humid environments where sweat is not easily removed from the surface of the skin by evaporation. When extensive or complicated by infection, heat rash can be so uncomfortable that it inhibits sleep and impedes an employee's performance or even results in temporary total disability. It can be prevented by resting in a cool place and allowing the skin to dry.

PREVENTING HEAT STRESS

Most heat-related health problems can be prevented or the risk of developing them reduced. The following are a few basic precautions to minimize the potential for heat stress:

1. A variety of engineering controls including general ventilation and spot cooling by local exhaust ventilation at points of high heat production may be helpful. Shielding is required as protection from radiant heat sources. Evaporative cooling and mechanical refrigeration are other ways to reduce heat. Cooling fans can also reduce heat in hot conditions. Eliminating steam leaks will also help. Equipment modifications, the use of power tools to reduce manual labor, and personal cooling devices or protective clothing are other ways to reduce the hazards of heat exposure for employees.
2. Work practices, such as providing plenty of drinking water (as much as a quart per employee per hour) at the workplace, can help reduce the risk of heat disorders. Training first aid responders to recognize and treat heat stress disorders and making the names of trained staff known to all employees is essential. Employers should also consider an individual's physical condition when determining his or her fitness for working in hot environments. Older employees, obese employees, and personnel on some types of medication are at greater risk.
3. Alternating work and rest periods with longer rest periods in a cool area can help employees avoid heat stress. If possible, heavy work should be scheduled during the cooler parts of the day and appropriate protective clothing provided. Supervisors should be trained to detect the early signs of heat stress and should permit employees to interrupt their work if they are extremely uncomfortable.
4. Acclimatization to heat through short exposures followed by increased periods of work in the hot environment can reduce heat stress. New employees and employees returning from an absence of two weeks or more should have a five-day period of acclimatization.

TRAINING

Education is essential to increasing employee awareness of the symptoms of heat illness and the importance of daily weighing before and after work to avoid dehydration. Employees should be trained on the following topics:

1. Environmental and personal risk factors for heat illness.
2. Employer's procedures for identifying, evaluating, and controlling exposures to the environmental and personal risk factors for heat illness.
3. Importance of acclimatization and frequent consumption of water.

4. Different types of heat illness, common signs and symptoms of heat illness and the importance of immediately reporting symptoms or signs of heat illness in themselves or coworkers.
5. Procedures for responding to symptoms of possible heat illness.
6. Procedures for contacting emergency medical services and how to provide clear and concise directions to the work site.

In addition to these training requirements, supervisory personnel should receive additional training on the procedures to follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures.

CAL/OSHA COMPLIANCE

Refer to Section 3395 of the General Industry Safety Orders (<http://www.dir.ca.gov/Title8/3395.html>) for information regarding the Cal/OSHA Heat Illness Prevention regulation. The subjects covered include the scope and application of the regulation, definitions, provisions of water, access to shade and supervisor and employee training.

OSHA QUICK CARD™

Protect Yourself Heat Stress



When the body is unable to cool itself by sweating, several heat-induced illnesses such as heat stress or heat exhaustion and the more severe heat stroke can occur, and can result in death.

Factors Leading to Heat Stress

High temperature and humidity; direct sun or heat; limited air movement; physical exertion; poor physical condition; some medicines; and inadequate tolerance for hot workplaces.

Symptoms of Heat Exhaustion

- Headaches, dizziness, lightheadedness or fainting.
- Weakness and moist skin.
- Mood changes such as irritability or confusion.
- Upset stomach or vomiting.

Symptoms of Heat Stroke

- Dry, hot skin with no sweating.
- Mental confusion or losing consciousness.
- Seizures or fits.

Preventing Heat Stress

- Know signs/symptoms of heat-related illnesses; monitor yourself and coworkers.
- Block out direct sun or other heat sources.
- Use cooling fans/air-conditioning; rest regularly.
- Drink lots of water; about 1 cup every 15 minutes.
- Wear lightweight, light colored, loose-fitting clothes.
- Avoid alcohol, caffeinated drinks, or heavy meals.

What to Do for Heat-Related Illness

- Call 911 (or local emergency number) at once.

While waiting for help to arrive:

- Move the worker to a cool, shaded area.
- Loosen or remove heavy clothing.
- Provide cool drinking water.
- Fan and mist the person with water.

For more complete information:

OSHA Occupational
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